Quality-Assessed Agrichemical Contaminant Database for Nebraska Ground Water

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Title: Quality-Assessed Agrichemical Contaminant Database for Nebraska Ground Water
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Description:
Abstract:

The database contains ground-water nitrate and pesticide data that have been compiled from federal, state and local agencies and the University of Nebraska; screened for essential data elements; evaluated using established criteria; and assigned a quality flag that corresponds to one of five quality assessment levels. Each quality assessment level has criteria for the evaluation of well location, well characteristics, sampling procedure and sample preservation, analytical method, field quality control, and laboratory quality control. Level 1 data meet the minimum standards for acceptable data while level 5 data are the most defensible. The criteria for evaluating the nitrate and pesticide data are presented in Tables 1 and 2, respectively. The user-friendly format allows the data to be input into a wide range of applications and easily imported into Geographic Information Systems. The Nebraska Department of Agriculture and the Nebraska Department of Environmental Quality provide both direction and financial support for the clearinghouse.

Table 1. Quality Assessment Levels for Nitrate Data.

REQUIREMENTS	**CRITERIA**				
	LEVEL 1	**LEVEL 2**	**LEVEL 3**	**LEVEL 4**	**LEVEL 5**
Well location	¼ section at minimum				
Well characteristics	use, depth			use, depth, screened interval (s)	monitoring well, depth, screened interval
Sampling Date	month, day, and year sample was collected				
Sampling procedure & sample preservation	well purged to ensure sample represents ground-water source (e.g. pumping until temperature, pH and conductivity stabilize; removing three casing volumes; monitoring analyte of interest until concentration stabilizes). Sample container and preservation procedures follow those given in analytical method.				
Analytical method	not a standard method approved by EPA, ASTM, or AWWA	a standard method approved for the analyte by EPA, ASTM, or AWWA			best available method specific for analyte (e.g. NO_3 is measured; not $NO_3 + NO_2$)
Field QA practices	none		collection and analysis of field duplicates (FDs)	collection and analysis of FDs and equipment blanks	
Laboratory QA practices	cross-checks of >10% of the samples using a standard method approved by EPA, AWWA, or ASTM that confirms results. Participation in performance evaluation studies	less than level 3	laboratory duplicates, reagent blanks, fortified blanks, quality control samples	laboratory duplicates, reagent blanks, fortified blanks, quality control samples, lab fortified matrix samples	laboratory duplicates, reagent blanks, fortified blanks, quality control samples, lab fortified matrix samples

Table 2. Quality Assessment Levels for Pesticide Data.

REQUIREMENTS	CRITERIA				
	LEVEL 1	**LEVEL 2**	**LEVEL 3**	**LEVEL 4**	**LEVEL 5**
Well location	¼ section at minimum				
Well characteristics	use, depth			use, depth, screened interval (s)	monitoring well, depth, screened interval
Sampling date	month, day and year sample was collected				
Sampling procedure & sample preservation	well purged to ensure sample represents ground-water source (e.g. pumping until temperature, pH and conductivity stabilize; removing three casing volumes; monitoring analyte of interest until concentration stabilizes). Sample container and preservation procedures follow those given in analytical method.				
Analytical method	not a standard method approved by EPA, ASTM, or AWWA	a standard method approved for the analyte by EPA, ASTM, or AWWA		a GC/MS method approved for the analyte by EPA, ASTM, or AWWA	best available method specific for analyte (e.g. state-of-the-art GC/MS method using isotope dilution)
Field QA practices	none		collection and analysis of field duplicates (FDs)	collection and analysis of FDs and equipment blanks	
Laboratory QA practices	cross-checks of >10% of the samples using a standard method approved by EPA, AWWA, or ASTM that confirms results. Participation in performance evaluation studies	less than level 3	analysis of laboratory duplicates and the minimum QC specified in the method		

Purpose:
The nitrate and pesticide database was created to provide a centralized data repository which organizes the data collection process; gives impetus to a more coordinated and sustained data collection effort; eliminates redundancy; streamlines periodic assessments of monitoring programs; measures the impact of management practices; makes judicious use of financial resources and personnel and makes costly data readily accessible to everyone with an interest in protecting ground-water quality. The reliability of the data is assessed and each contaminant concentration assigned a quality flag so that the user can know how reflective the concentrations are of aquifer conditions.

Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 1974
Ending_Date: 2004
Currentness_Reference:
The previous years'data are requested annually from each agency collecting ground-water data. Upon receipt the data are reviewed for completeness, entered into a spreadsheet, assigned to a data quality assessment level, and entered into the database. The on-line database is updated quarterly.

Status:
Progress: In-work
Maintenance_and_Update_Frequency: Quarterly

Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -104.048
East_Bounding_Coordinate: -95.344
North_Bounding_Coordinate: 42.998
South_Bounding_Coordinate: 40.002

Keywords:
Theme:
Theme_Keyword_Thesaurus: none
Theme_Keyword: groundwater quality
Theme_Keyword: agrichemical
Theme_Keyword: nitrate
Theme_Keyword: atrazine
Theme_Keyword: pesticide
Theme_Keyword: herbicide
Place:
Place_Keyword_Thesaurus: none
Place_Keyword: USA
Place_Keyword: Nebraska

Access_Constraints: none
Use_Constraints:
None. Please acknowledge the University of Nebraska-Lincoln and contributing agencies when citing/using these data.

Point_of_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: University of Nebraska-Lincoln
Contact_Person: Dottie Harrell
Contact_Position: Data Manager
Contact_Address:
Address_Type: mailing and physical
Address:
128 Keim Hall
University of Nebraska-Lincoln
City: Lincoln
State_or_Province: NE
Postal_Code: 68583-0915
Country: USA
Contact_Voice_Telephone: (402) 472-3150
Contact_Facsimile_Telephone: (402) 472-2906
Contact_Electronic_Mail_Address dharrell2@unl.edu

Data_Quality_Information:

Attribute_Accuracy
Attribute_Accuracy_Report:
The sampling date, analyte and concentration and the well's legal location, registration number, depth and type are obtained from the contributing agency. This information can be supplied as a database and/or gleaned from either reports or publications. If the well registration number is supplied by the contributing agency, the legal location is that given in the Nebraska Department of Natural Resources (NDNR) Registered Groundwater Wells database unless there is compelling evidence that the information is incorrect. The county and natural resources district also are as given in the NDNR database. If the well is not registered, the legal location is that supplied by the contributing agency. Most of the screened intervals are obtained from the NDNR well registration form; the others from the contributing agency. Field and laboratory protocols and quality assurance practices necessary to assess the quality of the data and assign a quality assessment flag are provided by the contributing agency and the laboratory performing the analyses. The quality assessment flag for each contaminant concentration is an indicator of the level of confidence in the data.

Logical_Consistency_Report:
Staff from several agencies conduct well sampling while a few laboratories using variations of a few analytical methods perform the analyses. The extent of field and laboratory QC also varies both with and within the agency. Because the criteria for the five quality assessment

levels address the range of protocols, the user can be relatively confident that the data in each level are comparable. All laboratories do not subscribe to the American Chemical Society definition of “reporting limit”; consequently, some of the very low “reporting limits” are instrument detection limits. Thus “reporting limit” in the database is the “less than value” contained in the contributing agency’s data.

Because wells are not physically labeled with an identifier, it can be difficult to determine if the same well has been sampled by more than one agency. This is especially true with closely spaced wells. If there is doubt that the data are from the same well, the data are treated as being from two different wells. Legal locations have been checked to ascertain they are in the correct county and natural resources district.

Completeness_Report:
Each analyte record meets a minimum set of data elements. During the data completeness check, an effort is made to obtain missing data. If the effort is unsuccessful, either the analyte data or the well, depending on the unavailable information, is not included in the database. The nitrate data cover the period from 1974 through 2004 while the pesticide data are for the years 1976 through 2004.

Positional_Accuracy:
Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report:
Quantitative_Horizontal_Positional_Accuracy_Assessment:
Horizontal_Positional_Accuracy_Value:
Horizontal_Positional_Accuracy_Explanation:
Geographic coordinates are given as footage from the nearest section line or to the nearest quarter section or quarter-quarter section, if known. A program developed by the Nebraska Department of Natural Resources applies the coordinates of the center of the smallest subsection as the coordinates of the well.
Vertical_Positional_Accuracy:
Vertical_Positional_Accuracy_Report:
Quantitative_Vertical_Positional_Accuracy_Assessment:
Vertical_Positional_Accuracy_Value:
Vertical_Positional_Accuracy_Explanation:
For registered wells, well depth and screened intervals are from the NDNR Registered Groundwater Wells database. Depths and screened intervals for nonregistered wells were obtained from the contributing agency.

Lineage:
Source_Information:
Source_Citation:
Citation_Information:
Originator: Nebraska Dept. of Natural Resources
Publication_Date: updated daily
Title: Registered Ground Water Wells Database
Publication_Information:
Publication_Place: Lincoln, NE

Publisher: Nebraska Department of Natural Resources
Online_Linkage: http://dnrdata.dnr.state.ne.us/wellssql
Type_of_Source_Media: on-line and paper files
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 1931
Ending_Date: present
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: A
Source_Contribution:
Well registration and sequence numbers, legal location, county and natural resources district, well depth, screened interval(s) depths, well completion date, and well type

Source_Information:
Source_Citation:
Citation_Information:
Originator:
The entities contributing nitrate and pesticide data to the database which include the 23 Natural Resources Districts, the Nebraska Depts. of Agriculture and Environmental Quality, Nebraska Health and Human Services System, the University of Nebraska-Lincoln, and the U.S. Geological Survey.
Publication_Date:
Some of the data have been published in reports and professional papers, but much of it is contained in paper files and computerized databases of the data collection entity.
Source Time Period of Content:
Time Period Information:
Range_of_Dates/Times:
Beginning_Date: 1974
Ending_Date: 2004
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: B
Source_Contribution:
Well information (legal location of well, well depth and screened interval, entity's well identifier and well type), sampling results (sampling date, sample identification, nitrate and pesticide concentrations), and quality control information (field and laboratory QA procedures, laboratory methods and reporting limits).

Source_Information:
Source_Citation:
Citation_Information:
Originator:
Nebraska's Clearinghouse for Pesticide and Nitrate Data in Ground Water advisory committee approved the elements and criteria for the five quality assessment levels developed by the technical subcommittee.

Source_Citation_Abbreviation: E
Source_Contribution: Quality assessment level

Process_Step:
Process Description: Process 1
Source B data are received as spreadsheet, relational database or paper files. The data are checked for omissions and errors. Additions and/or corrections are made and incomplete data sets are removed.
Source_Used_Citation_Abbreviation: B
Source_Produced_Citation_Abbreviation: C
Process_Date: Ongoing

Process_Step:
Process Description: Process 2
Source A is obtained as a text file and imported to the well attributes table, one of three tables in the database (output source D), using ACCESS. Each well in Source A is assigned a clearinghouse number which is a unique number and the common field that links the three tables - well attributes, analyte data, and contributing agency - that form the database (output source D). For each registered well in output source C, the screened interval is obtained from the actual registration (source A) or, if available, from source A's electronic format. The screened interval(s) are added to the well attributes table. Clearinghouse numbers are assigned to unregistered wells and the well information for the unregistered wells is added to the well attributes table in source D.
Source_Used_Citation_Abbreviation: A
Source_Used_Citation_Abbreviation: C
Source_Produced_Citation_Abbreviation: D
Process_Date: Ongoing

Process_Step:
Process Description: Process 3
Once the data set is complete (source C), it is entered into an EXCEL spreadsheet and formatted for addition to the clearinghouse database.
Source_Used_Citation_Abbreviation: C
Source_Produced_Citation_Abbreviation: F
Process_Date: Ongoing

Process_Step:
Process Description: Process 4
The quality of each nitrate and pesticide result in source C is evaluated using quality assurance information supplied by the contributing agency (source B) and the quality assessment flag criteria (source E). The quality flag is assigned.
Source_Used_Citation_Abbreviation: B
Source_Used_Citation_Abbreviation: C
Source_Produced_Citation_Abbreviation: G
Process_Date: Ongoing
Process_Contact:
Contact_Information:

Contact_Organization_Primary:
Contact_Organization: University of Nebraska -Lincoln
Contact_Person: Mary Exner Spalding
Contact_Position: Clearinghouse coordinator
Contact_Address:
Address_Type: physical and mailing address
Address: 306A Biochemistry Hall
City: Lincoln
State_or_Province: NE
Postal_Code: 68583-0759
Country: USA
Contact_Voice_Telephone: 402-472-7547
Contact_Facsimile_Telephone: 402-472-8390
Contact_Electronic_Mail_Address: mspalding1@unl.edu

Process_Step:
Process Description: Process 5
The quality assessment flag (source G) and the reporting limit (source B) are added to the EXCEL worksheet (source F).
Source_Used_Citation_Abbreviation: B
Source_Used_Citation_Abbreviation: G
Source_Used_Citation_Abbreviation: F
Process_Date: Ongoing

Process_Step:
Process Description: Process 6
The data in source F are added to the analyte data table in the database (source D).
Source_Used_Citation_Abbreviation: F
Source_Produced_Citation_Abbreviation: D
Process_Date: Ongoing

Process_Step:
Process Description: Process 7
Legal locations are converted to UTM Zone 14, NAD 27 coordinates and/or decimal degrees.
Source_Used_Citation_Abbreviation: D
Source_Produced_Citation_Abbreviation: F
Process_Date: Quarterly
Process_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: Nebraska Department of Natural Resources
Contact_Person Richard Kern
Contact_Position:
Contact_Address:
Address_Type: physical and mailing
Address: 310 Centennial Mall South, P.O. Box 94876

City: Lincoln
State_or_Province: NE
Postal_Code: 68583-0844
Country: USA
Contact_Voice_Telephone: 402-471-3948
Contact_Facsimile_Telephone: 402-471-2900
Contact_Electronic_Mail_Address: rkern@dnr.state.ne.us

Spatial_Reference_Information:

Horizontal_Coordinate_System_Definition:
Geographic:
Latitude_Resolution: Single precision
Longitude_Resolution: Single precision
Geographic_Coordinate_Units: Decimal degrees
Planar:
Grid_Coordinate_System:
Grid_Coordinate_System_Name: Universal Transverse Mercator
Universal_Transverse_Mercator:
UTM_Zone_Number: 14
Transverse_Mercator:
Scale_Factor_at_Central_Meridian: .9996
Longitude_of_Central_Meridian: -99.0
Latitude_of_Projection_Origin: 0.0
False_Easting: 500,000
False_Northing: 0.0
Planar_Coordinate_Information:
Planar_Coordinate_Encoding_Method: coordinate pair
Coordinate_Representation:
Abscissa_Resolution: 160.934
Ordinate_Resolution: 201.168
Planar_Distance_Resolution: meters
Geodetic_Model:
Horizontal_Datum_Name: North American Datum of 1927
Ellipsoid_Name: Clark 1866
Semi-major_Axis: 6,378,206.4
Denominator_of_Flattening_Ratio: 294.9787

Entity_and_Attribute_Information:

Detailed_Description:
Entity_Type:
Entity_Type_Label: Microsoft Access database
Entity_Type_Definition:
Nitrate and pesticide results and well attribute information for wells in Nebraska

Attribute:
Attribute_Label: Clearinghouse #

Attribute_Definition:
A unique identifying number assigned to each well and also to each ground-water sampler (i.e. each sampling tube in a multilevel sampler) in the database.
Attribute_Domain_Values:
Unrepresentable_Domain_Value:
The numeric number of the record. Unlimited numbers are assigned.

Attribute:
Attribute_Label: Township
Attribute_Definition:
A number designating the township in which the well is located. Township lines are horizontal lines roughly six miles apart from each other. In Nebraska they begin at 40° N and proceed north. The townships are numbered consecutively starting with one for the first six mile increment, two for the second six mile increment, etc. The first township north of 40° N is Township One North. All township numbers in the database should be assumed to be North.
Attribute_Domain_Values:
Range_Domain:
Range_Domain_Minimum: 1
Range_Domain_Maximum: 35
Attribute:
Attribute_Label: Range
Attribute_Definition:
Range in which the well is located. Range lines are vertical lines roughly six miles apart. In Nebraska, numbering begins at the Sixth Principal Meridian (P.M.). The first range East of the 6th P.M. is called Range One East, the second is Range Two East, etc. The same numbering system applies West of the 6th P.M.
Attribute_Domain_Values:
Range_Domain:
Range_Domain_Mimimum: 1
Range_Domain_Maximum: 59

Attribute:
Attribute_Label: Direction
Attribute_Definition:
The direction of the range in relation to the Sixth Principal Meridian.
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: E is East of the Sixth Principal Meridian
Enumerated_Domain_Value: W is West of the Sixth Principal Meridian

Attribute:
Attribute_Label: Section
Attribute_Definition:
The section in which the well is located. Each 36-square mile area bounded by township and range lines is divided into 36 sections (6 X 6). A section is 640 acres. The sections are numbered such that section 1 is in the northeast corner and the numbering

continues going west until section 6 is reached. The first section south of section 6 is section 7 and numbering continues to the east. After section 12 the numbering continues to wrap around at the end of each row. Section 36 is in the southeast corner of the township.

Attribute_Domain_Values

Range_Domain:

Range_Domain_Minimum: 1

Range_Domain_Maximum: 36

Attribute:

Attribute_Label: Subsection

Attribute_Definition:

The subsection in which the well is located. The letters indicate the location of the well within the section (640 acres). The first letter indicates the quarter section (160 acres), the second the quarter-quarter section (40 acres), etc. The letters are applied in a counterclockwise direction beginning with “A” in the northeast quadrant and ending with “D” in the southeast quadrant. “O” indicates that the well is in the center of the section if it follows the section number or in the center of the quarter if it follows the letters A, B, C, or D.

Attribute_Domain_Values:

Enumerated_Domain:

Enumerated_Domain_Value: A

Enumerated_Domain_Value_Defintion:

A location in the northeast quarter of the section, quarter section, quarter-quarter section, etc.

Enumerated_Domain_Value: B

Enumerated_Domain_Value_Defintion:

A location in the northwest quarter of the section, quarter section, quarter-quarter section, etc.

Enumerated_Domain_Value: C

Enumerated_Domain_Value_Defintion:

A location in the southwest quarter of the section, quarter section, quarter-quarter section, etc.

Enumerated_Domain_Value: D

Enumerated_Domain_Value_Defintion:

A location in the southeast quarter of the section, quarter section, quarter-quarter section, etc.

Enumerated_Domain_Value: O

A location in the center of the section, quarter section, quarter-quarter section, etc.

Attribute:

Attribute_Label: NRD

Attribute_Definition:

The Natural Resources District in which the well is located. NRDs are political subdivisions of state government whose boundaries are loosely based on watershed boundaries.

Attribute_Domain_Values:

Unrepresentable_Domain: The names of the 23 Natural Resources Districts

Enumerated_Domain:

CPNRD - Central Platte NRD
LCNRD - Lewis & Clark NRD
LBNRD - Little Blue NRD
LBBNRD - Lower Big Blue NRD
LENRD - Lower Elkhorn NRD
LLNRD - Lower Loup NRD
LNNRD - Lower Niobrara NRD
LPNNRD - Lower Platte North NRD
LPSNRD - Lower Platte South NRD
LRNRD - Lower Republican NRD
MNNRD - Middle Niobrara NRD
MRNRD - Middle Republican NRD
NNRD - Nemaha NRD
NPNRD – North Platte NRD
PNRD - Papio-Missouri River NRD
SPNRD - South Platte NRD
TBNRD - Tri-Basin NRD
TPNRD - Twin Platte NRD
UBBNRD - Upper Big Blue NRD
UENRD - Upper Elkhorn NRD
ULNRD - Upper Loup NRD
UNWNRD - Upper Niobrara-White NRD
URNRD - Upper Republican NRD

Attribute:

Attribute_Label: County

Attribute_Definition: The county in which the well is located.

Attribute_Domain_Values:

Unrepresentable_Domain_Value: The names of the 93 counties in Nebraska

Attribute:

Attribute_Label: Well Depth

Attribute_Definition:

Depth of the well as measured from the land surface to the bottom of the well casing.

Attribute_Units_of_Measure: feet

Attribute:

Attribute_Label: Screened Interval

Attribute_Definition:

The depth from the land surface of the top and bottom of the intake screen(s). The well screen allows water to pass from the aquifer into the well.

Attribute_Domain_Values:
Attribute_Units_of_Measure: feet

Attribute:
Attribute_Label: Well Use
Attribute_Definition:
Indicates how the water from the well is used. It can also give a general indication of the type of well construction.
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: I
Enumerated_Domain_Value_Definition:
A well that provides irrigation water to cropland exceeding a total of two acres. Usually the well has a large diameter and it may be screened at multiple depths in the saturated zone.
Enumerated_Domain_Value: D
Enumerated_Domain_Value_Definition:
A well other than a public water supply, livestock, or irrigation well that provides water for human consumption. Usually a small diameter well screened near the top of the aquifer.
Enumerated_Domain_Value: P
Enumerated_Domain_Value_Definition:
A public supply well i.e. a well providing water for consumption to a group or groups of unrelated people. These wells have at least 15 service connections or regularly serve at least 25 individuals. Wells serving villages, municipalities, schools, restaurants, rest-stops, and rural water districts are public supply wells.
Enumerated_Domain_Value: S
Enumerated_Domain_Value_Definition:
A well supplying water for livestock consumption. Usually a small diameter well screened near the top of the aquifer.
Enumerated_Domain_Value: C
Enumerated_Domain_Value_Definition:
A well supplying water for industrial or manufacturing purposes. These wells can be either large or small diameter wells. They can provide water for processing, cooling, cleaning, and fire protection.
Enumerated_Domain_Value: Q
Enumerated_Domain_Value_Definition:
A well installed for the sole purpose of monitoring ground water. These wells may have single or multiple screened intervals or be screened throughout the entire saturated thickness. Monitoring wells also can be nested wells, which are two or more wells with screens at different depths in the aquifer that are placed in the same borehole. Monitoring wells also include multilevel samplers. Each sampler consists of many small diameter (e.g. 3/8-inch) tubes with a screen at one end, bundled together and placed in the same borehole. Each sampler obtains ground water from a discrete point in the aquifer.

Attribute:
Attribute_Label: Contaminant Name
Attribute_Definition: Common name of the chemical measured
Attribute_Domain_Values:
Unrepresentable_Domain: Analytes measured in samples

Attribute:
Attribute_Label: Date Sampled
Attribute_Definition:
The month, day and year the sample was collected. Occasionally only the month and year are known. In those cases the default is the first day of the month.
Attribute_Domain_Values
Unrepresentable_Domain: the date the water quality sample was collected.

Attribute:
Attribute_Label: Depth Sampled
Attribute_Definition:
The depth from which the sample was obtained. This parameter is used with multilevel samplers which collect water from a point rather than a vertical interval.
Attribute_Domain_Values:
Attribute_Units_of_Measure: feet

Attribute:
Attribute_Label: Concentration
Attribute_Definition: Concentration of the analyte
Attribute_Domain_Values:
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: 0
Enumerated_Domain_Value_Definition:
Zero means the concentration of the analyte is less than the reporting limit.
Attribute_Units_of_Measure:
Nitrate-nitrogen concentrations are in milligrams per liter (parts per million). Pesticide concentrations are in micrograms per liter (parts per billion).

Attribute:
Attribute_Label: Reporting limit
Attribute_Definition:
The reporting limit is this database can be the quantitation limit, the method detection limit or the instrument detection limit. In the database the reporting limit usually is the limit of quantitation which is a higher concentration than the method detection limit or the instrument detection limit; consequently, there is less uncertainity in the analytical result than occurs when laboratories use the method detection limit or instrument detection limit as a reporting limit.
Attribute_Domain_Values:
Attribute_Units_of_Measure:

Nitrate-nitrogen reporting limits are in milligrams per liter (parts per million). Pesticide concentrations are in micrograms per liter (parts per billion).

Attribute:
Attribute_Label: Quality Flag
Attribute_Definition:
Each analytical result is evaluated using established criteria and assigned a quality flag that corresponds to a quality assessment level. The criteria for evaluating well location, well characteristics, sampling and sample preservation procedures, analytical method, field quality control and laboratory quality control are given in Table 1 for nitrate data and Table 2 for pesticide data. Level 1 data meet the minimum standards for acceptable data while Level 5 are the most defensible data.
Attribute_Domain_Values:
Range_Domain:
Range_Domain_Minimum: 1
Range_Domain_Maximum: 5
Enumerated_Domain:
Enumerated_Domain_Value: 3
Enumerated_Domain_Value_Definition:
For an atrazine analyte concentration with a quality flag of 3, the well location is known at least to the quarter section and the depth and use of the well are documented. The sample was collected in a thoroughly cleaned, pre-combusted glass bottle after the well was purged using an accepted technique (e.g. after three casing volumes were removed from the well or until temperature, pH and/or conductivity had stabilized). Field duplicates were collected during the sampling event. The sample was protected from the light and kept at 4°C until it reached the laboratory. Extraction of the sample occurred within 14 days. The analytical method employed could be USEPA Method 507 which is a methylene chloride extraction followed by concentration of the extract and gas chromatographic analysis using a nitrogen-phosporus detector and second column confirmation. Laboratory quality control requirements are the minimum given in the method. For Method 507 the requirements include the use of a surrogate and internal standard in each sample and blank and regular analyses of laboratory duplicates, laboratory reagent blanks, laboratory fortified blanks, laboratory fortified matrix samples, and a quality control sample obtained from an external source. The atrazine could also be analyzed by USEPA Method 525. In this method the analyte is extracted from water onto a cartridge containing a chemically bonded C18 organic phase; the analyte eluted, and concentrated. The extract is analyzed in a gas chromatography/mass spectrometry system equipped with a high-resolution fused silica capillary column. The laboratory quality control program is the minimum given in USEPA Method 525 and includes regular analyses of laboratory reagent blanks, laboratory fortified blanks, and laboratory fortified matrix samples. Method 525 is a GC/MS method. Taking equipment blanks for wells without dedicated pumps and knowing the screened interval of the well would improve the quality assessment level to 4.
Enumerated_Domain:

Enumerated_Domain_Value: 5
Enumerated_Domain_Value_Definition:
For a nitrate result with a quality flag of 5, the location of the monitoring well to at least the quarter section and the depth and screened intervals of the well are known. After the well was purged using an accepted technique (e.g. after three casing volumes were removed from the well or until nitrate concentration had stabilized), the sample was collected in a thoroughly cleaned plastic or glass bottle. Field duplicates and equipment blanks (if the monitoring well does not have a dedicated pump) were collected during the sampling event. The sample was kept at 4°C until it reached the laboratory where it was stored at 4°C until analyzed within the 48-hour holding time. The analytical method employed is one that specifically measures nitrate (e.g. USEPA Method 300.0, Determination of inorganic anions by ion chromatography) or measures nitrate plus nitrite-nitrogen and nitrite-nitrogen (USEPA Method 353.2, Determination of nitrate-nitrite nitrogen by automated colorimetry). The objective is to have the nitrate-nitrogen concentration truly nitrate and not to dismiss the nitrite concentration in ground water as negligible as is usually done with method 353.2. There must be a full range of laboratory quality control samples. They include the analysis of laboratory reagent blanks, laboratory fortified blanks, and laboratory fortified matrix samples, and other quality control samples as a continuing check on laboratory performance.

Table 1. Quality Assessment Levels for Nitrate Data.

REQUIREMENTS	**CRITERIA**				
	LEVEL 1	**LEVEL 2**	**LEVEL 3**	**LEVEL 4**	**LEVEL 5**
Well location	¼ section at minimum				
Well characteristics	use, depth			use, depth, screened interval (s)	monitoring well, depth, screened interval
Sampling Date	month, day, and year sample was collected				
Sampling procedure & sample preservation	well purged to ensure sample represents ground-water source (e.g. pumping until temperature, pH and conductivity stabilize; removing three casing volumes; monitoring analyte of interest until concentration stabilizes). Sample container and preservation procedures follow those given in analytical method.				
Analytical method	not a standard method approved by EPA, ASTM, or AWWA	a standard method approved for the analyte by EPA, ASTM, or AWWA			best available method specific for analyte (i.e. NO_3 is measured; not $NO_3 + NO_2$)
Field QA practices	none		collection and analysis of field duplicates (FDs)	collection and analysis of FDs and equipment blanks	
Laboratory QA practices	cross-checks of >10% of the samples using a standard method approved by EPA, AWWA, or ASTM that confirms results. Participation in performance evaluation studies	less than level 3	laboratory duplicates, reagent blanks, fortified blanks, quality control samples	laboratory duplicates, reagent blanks, fortified blanks, quality control samples, lab fortified matrix samples	laboratory duplicates, reagent blanks, fortified blanks, quality control samples, lab fortified matrix samples

Table 2. Quality Assessment Levels for Pesticide Data.

REQUIREMENTS	CRITERIA				
	LEVEL 1	**LEVEL 2**	**LEVEL 3**	**LEVEL 4**	**LEVEL 5**
Well location	¼ section at minimum				
Well characteristics	use, depth			use, depth, screened interval (s)	monitoring well, depth, screened interval
Sampling date	month, day and year sample was collected				
Sampling procedure & sample preservation	well purged to ensure sample represents ground-water source (e.g. pumping until temperature, pH and conductivity stabilize; removing three casing volumes; monitoring analyte of interest until concentration stabilizes). Sample container and preservation procedures follow those given in analytical method.				
Analytical method	not a standard method approved by EPA, ASTM, or AWWA	a standard method approved for the analyte by EPA, ASTM, or AWWA		a GC/MS method approved for the analyte by EPA, ASTM, or AWWA	best available method specific for analyte (e.g. state-of-the-art GC/MS method using isotope dilution)
Field QA practices	none		collection and analysis of field duplicates (FDs)	collection and analysis of FDs and equipment blanks	
Laboratory QA practices	cross-checks of >10% of the samples using a standard method approved by EPA, AWWA, or ASTM that confirms results. Participation in performance evaluation studies	less than level 3	analysis of laboratory duplicates and the minimum QC specified in the method		

Attribute:
Attribute_Label: Sample ID
Attribute_Definition: The sample identification used by the agency submitting the data.
Attribute_Domain_Values:
Unrepresentable_Domain: The alphanumeric designation for each sample

Attribute:
Attribute_Label: Agency Code
Attribute_Definition: The abbreviation of the entity contributing the data
Attribute_Domain_Values:
Unrepresentable_Domain: The entities contributing data
Enumerated_Domain_Value_Definition:
CPNRD - Central Platte Natural Resources District
LCNRD - Lewis & Clark Natural Resources District
LBNRD - Little Blue Natural Resources District
LBBNRD - Lower Big Blue Natural Resources District
LENRD - Lower Elkhorn Natural Resources District
LLNRD - Lower Loup Natural Resources District
LNNRD - Lower Niobrara Natural Resources District
LPNNRD - Lower Platte North Natural Resources District
LPSNRD - Lower Platte South Natural Resources District
LRNRD - Lower Republican Natural Resources District
MNNRD - Middle Niobrara Natural Resources District
MRNRD - Middle Republican Natural Resources District
NDA - Nebraska Department of Agriculture
NDEQ - Nebraska Department of Environmental Quality
NDOH - Nebraska Health and Human Services System
NNRD - Nemaha Natural Resources District
NPNRD - North Platte Natural Resources District
PNRD - Papio-Missouri River Natural Resources District
SPNRD - South Platte Natural Resources District
TBNRD - Tri-Basin Natural Resources District
TPNRD - Twin Platte Natural Resources District
UBBNRD - Upper Big Blue Natural Resources District
UENRD - Upper Elkhorn Natural Resources District
ULNRD - Upper Loup Natural Resources District
UN - University of Nebraska-Lincoln
UNWNRD - Upper Niobrara-White Natural Resources District
URNRD - Upper Republican Natural Resources District
USGS - U.S. Geological Survey

Attribute:
Attribute_Label: Registration #
Attribute_Definition:

The well registration number is a 3 to 6 digit number with a letter prefix (e.g. G11878) and sometimes a suffix (A6779B). The prefix "A" designates a well registered before 1957 when the law to register wells went into effect while the prefix "G" designates a well registered after the law's effective date. The suffix designates the well is one of a series of wells having a common pumping system. Each well in the series will have the same registration number and a different suffix letter (A-Z, AA-ZZ). Letters following the suffix give the status of the well. "X" indicates the well has been abandoned (e.g. A6779B X). "R" indicates a replacement well while the number before the "R" is the number of times the original well has been replaced (e.g. A6779B 1R).

Attribute_Definition_Source: Nebraska Department of Natural Resources
Attribute_Domain_Values:
Unrepresentable_Domain:
Well registration numbers for the more than 110,000 registered wells

Attribute:
Attribute_Label: Sequence #
Attribute_Definition: The record number in the data set
Attribute_Definition_Source: Nebraska Department of Natural Resources
Attribute_Domain_Values:
Unrepresentable_Domain:
A unique number for each of the more than 110,000 registered wells

Attribute:
Attribute_Label: System
Attribute_Definition:
Refers to whether the sample was collected from an individual well or from a piping system that joins two or more wells together. Irrigation wells can be plumbed together without access to the wellhead to obtain sufficient volume.
Attribute_Domain_Values:
Enumerated_Domain: Y
Enumerated_Domain_Value_Definition:
The reported concentration is from a system that contains ground water from two or more wells.

Attribute:
Attribute_Label: Completion Date
Attribute_Definition: The date well construction was completed
Attribute_Definition_Source: Nebraska Department of Natural Resources
Attribute_Domain_Values:
Unrepresentable_Domain: Calendar dates

Attribute:
Attribute_Label: NRD #
Attribute_Definition:
The Natural Resource District's identification for the well
Attribute_Domain_Values:
Unrepresentable_Domain: An alphanumeric designation

Attribute:
Attribute_Label: DEQ #
Attribute_Definition:
The Department of Environmental Quality's identification for the well
Attribute_Domain_Values:
Unrepresentable_Domain: An alphanumeric designation

Attribute:
Attribute_Label: NoH #
Attribute_Definition:
The Nebraska Health and Human Services identification for the well
Attribute_Domain_Values:
Unrepresentable_Domain: An alphanumeric designation

Attribute:
Attribute_Label: WSL #
Attribute_Definition:
The University of Nebraska Water Sciences Laboratory identification for the well
Attribute_Domain_Values:
Unrepresentable_Domain: An alphanumeric designation

Attribute:
Attribute_Label: USGS #
Attribute_Definition:
The U.S. Geological Survey's identification for the well
Attribute_Domain_Values:
Unrepresentable_Domain: An alphanumeric designation

Attribute:
Attribute_Label: CSD #
Attribute_Definition:
The University of Nebraska Conservation and Survey Division identification for the well
Attribute_Domain_Values:
Unrepresentable_Domain: An alphanumeric designation

Attribute:
Attribute_Label: X
Attribute_Definition: X coordinate
Attribute_Domain_Values:
Range_Domain:
Range_Domain_Minimum:
Range_Domain_Maximum:
Attribute_Units_of_Measure:
Unrepresentable_Domain:

Attribute:
Attribute_Label: Y

Attribute_Definition: Y coordinate
Attribute_Domain_Values
Range_Domain:
Range_Domain_Minimum:
Range_Domain_Maximum:
Attribute_Units_of_Measure:
Unrepresentable_Domain:

Attribute:
Attribute_Label: LongDD
Attribute_Definition: longitude in decimal degrees
Attribute_Domain_Values:
Range_Domain:
Range_Domain_Minimum:
Range_Domain_Maximum:
Attribute_Units_of_Measure:
Unrepresentable_Domain:

Attribute:
Attribute_Label: LatDD
Attribute_Definition: latitude in decimal degrees
Attribute_Domain_Values:
Range_Domain:
Range_Domain_Minimum:
Range_Domain_Maximum:
Attribute_Units_of_Measure:
Unrepresentable_Domain:

Distribution_Information:

Distributor:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: Nebraska Department of Natural Resources
Contact_Person: Rich Kern
Contact_Position:
Contact_Address:
Address_Type: mailing and physical
Address: 301 Centennial Mall South P.O. Box 94876
City: Lincoln
State_or_Province: NE
Postal_Code: 68509-4876
Country: USA
Contact_Voice_Telephone: (402) 471-3948
Contact_Facsimile_Telephone: (402) 471-2900
Contact_Electronic_Mail_Address: rkern@dnr.state.ne.us

Metadata_Reference_Information:

Metadata_Date: 200601
Metadata_Contact
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: University of Nebraska-Lincoln
Contact_Person: Mary Exner Spalding
Contact_Position: Clearinghouse coordinator
Contact_Address:
Address_Type: physical and mailing address
Address: 306A Biochemistry Hall
City: Lincoln
State_or_Province: NE
Postal_Code: 68583-0759
Country: USA
Contact_Voice_Telephone: 402-472-7547
Contact_Facsimile_Telephone: 402-472-8390
Contact_Electronic_Mail_Address: mspalding1@unl.edu
Metadata_Standard_Name:
Metadata_Standard_Version: